Hold until a fat Subjective returned
16 November 1956

TO : Chief, Supplemental Programs Division, OC

FROM: Chief, Communications Engineering Division

SUBJ: Reference Oscillator

REF : Memo to Chief, OC-E dated 11 October 1956, SPM-6-606

1. With reference to paragraph 2 of the above memorandum, a determination has been made as to the feasibility of employing the discontinuous unijunction transistor circuitry, in an audio reference oscillator.

2. Our experimental data indicates:

- a. Frequency stability of one to two percent.
- b. Continuous frequency variation of ten to one range
- c. Pulse or saw tooth output wave form.
- d. Small member of associated components.
- e. Optimum B voltage in the order of 45V.
- 3. At the present time there seems to be considerable variation in the characteristics of individual transistors.

 This makes it necessary to tailor three of the components in each oscillator to obtain the required frequency and stability.
- 4. It should be possible to produce a 1000 cycle reference oscillator in a package 3" x 2" x 1". This oscillator sould have an over-all frequency stability of $\frac{1}{2}$ 1% over the temperature range of from 0 to 50° C.
- 5. Note is made in paragraph 2 of the same reference memoas a reference memorandum that the unijunction oscillator would be used with the



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| Minifon recorder. | | | |
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The General Electric ZJ-14 unifunction transistor has been tested here at the laboratory to determine what can be expected from them in audio oscillator applications. The most important features of this transistor are:

- 1. Frequency stability of one to two percent.
- 2. Continuous frequency variations of the order of ten to one.
- 3. Hear Pulse or sawtooth wave shape.
- 4. Small number of components required.

At the present time there seems to be considerable variations in the characteristics of individual units. This makes it necessary to tailor the components in each oscillator to obtain the required frequency accuracy and stability.

It should be possible to produce a 1000 cycle reference oscillator in a package of approximately 3x2xl. This oscillator could have an overall frequency stability of $\frac{4}{36}$ over the temperature range of 0 to $\frac{4}{36}$ degrees 6entigrade.



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$\frac{\text{PROJECT}}{\text{R\&D}} \; \frac{\text{INITIATION}}{\text{LABORATORY}} \; \frac{\text{FORM}}{}$

| PROJECT TITLE: Fired Frequency | Reference Occillator (Will) Revort | |
|---|---|--------------|
| DATE DIRECTIVE RECEIVED: 17 Oct. | | |
| | Tov. 56 DATE REQUIRED: No Specific Date | |
| | | |
| PROJECT NUMBER: 2517-1 | SPN 6-606 (10-11-96) | |
| EQUIPMENT CLASSIFICATION: Unclass | AUTHORITY: SP/M 6-945 (19-3-56) | |
| SOURCE OF REQUEST: |] | .: OT A T |
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| PRIORITY: #3 SFD | | |
| TYPE OF EVALUATION: | ASSIGNED TO: Deciga | |
| DATE SUSPENDED OR CANCELLED: | Α. | |
| DESCRIPTION OF PROJECT: | | |
| prototype constructed un 2. Incorporate the features | Oscillators based on the tuning fork other project 2517. s outlined in Hemo SPN 6-606. L unit for leboratory retention. | |
| PROJECT FOLDER FILED: Room # Safe # Drawer # | | |
| Man-Hours Expended: Mechanical Electrical | SIGNED | STAT |
| FIECGLICAT | DATE 12-27-36 | |